

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

IMPLEMENTATION CONSIDERATIONS FOR A VIRTUAL PRIVATE NETWORK (VPN) TO ENABLE BROADBAND SECURE REMOTE ACCESS TO THE NAVAL POSTGRADUATE SCHOOL INTRANET

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As broadband connections to the home become more prevalent, through Digital Subscriber Lines (DSL) and cable modems, students and faculty will desire to access the NPS intranet via these new means instead of their 56K modems. The introduction of these new technologies will require NPS to re-evaluate how to allow remote access to their internal resources in a secure way, while still allowing for the use of broadband technologies.

This thesis will examine the alternative methods for implementing Virtual Private Networks (VPNs), from simple use of Point to Point Protocols (PPP) to high end specialized internet appliances and gateways. Pros and cons of each will be discussed. A mock-up of the school's network will be created to test each of the discussed methods. Final recommendations will be made for a model that can be used by the NPS to implement a VPN. Also discussed will be how that model may be altered to fit other commands throughout the U.S. Navy who desire similar secure remote access to their internal network resources.

It should be noted that the thesis will concentrate on remote secure access to an internal network from a single remote host more than on the VPNs' additional ability to remotely connect two or more secure networks together, such as can be found in a business to business (B-to-B) environment.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Virtual Private Network (VPN), Remote Access, Public Key Infrastructure (PKI), Broadband Access, and Computer Security

A COMMUNICATION LINK SOFTWARE MODEL FOR FLEET NUMERICAL METEOROLOGY AND OCEANOGRAPHY CENTER

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This thesis develops and provides an accurate simulation model of the communications pathway between Fleet Numerical Meteorology Oceanographic Center (FNMOC), Monterey, California and Naval Atlantic Meteorology Oceanographic Center (NLMOC), Norfolk, Virginia. In order to fulfill its mission to provide

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global weather forecasts to the warfighter, FNMOC must provide timely data to its customers. This model provides an analytic approach toward determining time delay with respect to bandwidth and its management. Additionally, this model enables the user to analytically determine the effects of hardware changes. Although other customers exist besides FLMOC, it is a major customer of data files in support of weather forecasting. The other major links are located in Rota, Spain; San Diego, California; Yokosuka, Japan; and Pearl Harbor, Hawaii. This model however, is scalable to simulate these other major links. The target audience for this information model is the technical support personnel at FNMOC Monterey, California, who manage the link with NLMOC Norfolk, Virginia. The information that supports this model was derived from field visits to technical personnel at FNMOC Monterey. No other communications software model has been developed at the present time. The discrete event software simulation tool used for this model is Extend™.

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Computing and Software, Modeling and Simulation

KEYWORDS: Model, Simulation, Network, Bandwidth, Meteorology, Extend™

MAINTENANCE ERROR INFORMATION MANAGEMENT SYSTEM (MEIMS) UPGRADE AND TRAINING EVALUATION

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The purpose of this thesis is to study the usability of an upgraded Maintenance Error Information Management System (MEIMS) tool used to capture human error in Naval Aviation maintenance mishaps. Built upon the Human Factors Analysis and Classification System-Maintenance Extension taxonomy, the tool provides the framework for examining maintenance errors that lead to mishaps, incidents, and personal injuries. The tool is developed for safety personnel, mishap investigators, Aircraft Mishap Board members, and analysts. In limited usability testing, the tool was found to be useful, but in need of revisions, specifically regarding functionality and user friendliness. Additionally, a tutorial is provided to better prepare targeted users of the tool. The study requires a review of mishap information systems, human error theories related to aviation mishaps, design considerations for human-computer interfaces and usability study applications. A follow-on usability study, conducted using two groups of potential users, one which received the tutorial and one which did not. It includes a survey regarding subjective responses about the prototype tool. The results indicate that the tutorial is effective in preparing and assisting potential users, and that the tool could make a significant impact in the reduction of mishap rates due to maintenance error.

DoD KEY TECHNOLOGY AREAS: Air Vehicles, Human Systems Interface, Manpower, Personnel and Training

KEYWORDS: Aviation Accidents, Aviation Mishaps, Accident Classification, Maintenance Mishaps, Maintenance Error, Human Factors, Human Error, Naval Aviation, Trend Analysis, Information Management System

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KNOWLEDGE PORTAL SUPPORT TO THE NAVAL POSTGRADUATE SCHOOL'S ADVANCED DISTRIBUTED LEARNING PROGRAM FOR THE INFORMATION SYSTEMS AND OPERATIONS CURRICULUM

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The Naval Postgraduate School is in the process of migrating the Information Systems and Operations curriculum to a nonresident mode of delivery. Once the migration is complete, there will be a knowledge base available for use by battle staffs as well as policy and acquisition leaders. A knowledge portal may be the solution to facilitating the use of the knowledge base by both learners and operators. The goal of this research is to show how developing a knowledge portal for use with the Information Systems and Operations curriculum knowledge base could expand the use of tacit and explicit knowledge by the operators. By providing access to this repository of information and knowledge, users can capture the most up-to-date knowledge on issues in the world's political and military environment, have the ability to collaborate with experts in the field, and receive answers to questions that will aide in resolving complex issues.

DoD KEY TECHNOLOGY AREA: Other (Information Technology)

KEYWORDS: Knowledge Management, Re-Engineering, Knowledge Portal, Advanced Distributed Learning, Analysis and Design, Information Technology, Information Systems

